Herbert Smith—Aircraft Designer

by JOHN CRAMPTON*

Herbert Smith with his R.Ae.S. Honorary Companionship Certificate, photographed in January this year at his home in Yorkshire

HERBERT SMITH was elected an Honorary Companion of the Royal Aeronautical Society earlier this year in recognition of his outstanding contribution to aviation during World War I. Today he lives in retirement in Yorkshire. This election cannot be allowed to pass without some explanation of the important activities of the recipient of this honour during his early years in aviation.

It is not easy to recapture the precise atmosphere of an earlier age and recall matters just as they were because time itself has an eroding effect on the memory of those who try to remember exactly what happened. The historian, who was not even around at the time, has to rely upon selecting such facts as he can gather and then reproduces a period, or series of events, as carefully as a painter selects his colours to make a whole picture.

The early life of Herbert Smith is the subject of this historical review, and the author is keenly aware that Herbert Smith himself is very likely to read this account of his days as an aircraft designer. All the evidence indicates that he spent his active years in aviation leading a team, and it was a team that produced some very successful results.

Herbert Smith was born in the village of Bradley, near Skipton, on 1st May 1889, his father being the Chief Accounts Clerk with the railway at Bradford, and his brother became a local Bank Manager.

He attended the village school in Bradley and later went on to the Keighley Grammar School. On leaving school his education took a more scientific turn when he enrolled at the Bradford Technical College to study Mechanical Engineering. In his class he was one of the three students who were able to qualify for their Diplomas.

After his studies were completed Herbert took a job to gain practical experience, joining Dean, Smith & Grace of Keighley, a firm making machine tools who are still very much in business today. From there he sought design and drawing office experience with Smith, Major & Stephens who manufactured lifts in Northampton.

Having acquired a sound basic training in various aspects of mechanical engineering, Herbert then became involved in the world of aircraft manufacture. He secured a position with the British & Colonial Aeroplane Co., at Bristol, working under Capt. Frank Barnwell and M. Henri Coanda, until 1914, when he moved across to Sopwith Aviation at Kingston-upon-Thames as leading draughtsman.

Sopwith had formed his company two years earlier in the disused roller skating rink in Canbury Park Road. The company had by 1914 expanded into new and larger offices further down the road. Tom Sopwith was still the lively supervisor of design but inevitably was becoming more and more engrossed with general management. To relieve him of accountancy tasks a young man called Frank Spriggs had been engaged as costing book-keeper and, for better control of technical matters, Herbert Smith was soon appointed chief designer. R. J. Ashfield, the former school master from nearby Tiffins School, who had been with Sopwith as his first draughtsman since October 1912, was given the role of project engineer and with a small carefully selected staff in the experimental department prepared initial designs from basic instructions and interpreted thoughts into working drawings. Among the first of such concepts was the Pup, the forerunner of which was built round a 50-h.p. rotary Gnome engine and had warping wings.

Herbert Smith, fair haired, with steel blue eyes, was an up and coming young man, who got on well with Sopwith's great factotum, Fred Sigrist, who in effect was the company's chief engineer, and quickly assimilated Sigrist's forcibly expressed ideas on the type of detail design which suited the company's skills and production facilities. He had a score of men on stressing and drawing, among whom was Sid Burgoyne, son of a famous boatbuilder at Kingston, who was the specialist in float design.

Herbert Smith (in white sweater, second row) with the Sopwith Aviation Football Team, 1915

1½ Strutter

Smith's first major task was to modify the design of an early company aircraft, the "Sigrist Bus", to give the aircraft equal span wings with the lower one moved slightly rearwards to improve the position of the centre of gravity. This aircraft resulted in the first of many 1½ Strutters made by Sopwith and a number of contractors in this country for the R.F.C., in addition to other manufacturers in France for the French Air Force. Smith worked closely with Sopwith, Sigrist, Harry Hawker and Ashfield on the design of the company's aircraft. It was Hawker who appreciated that the best handling qualities for a fighter would be derived from con-

*Now Deputy Sales Manager of Hawker Siddeley Aviation Ltd. at Kingston, John Crampton, D.F.C., A.F.C., A.F.R.Ae.S., served in the R.A.F. from 1940 to 1957 and was C.O. of the first Canberra squadron, No. 101.

Based on the Snipe, which it resembled externally, the Salamander was a trench fighter with 650 lb. of armour protection for the nose section. Over 183 Salamanders were built

Herbert Smith . . .

centrating the mass of the engine, guns, fuel and pilot to give minimum inertia and to ensure that the aircraft's C.G. was well forward. A careful study of the principal Sopwith fighters will reveal how closely the design team under Smith followed this layout.

By 1916 the respective drawing office teams of Ashfield and Herbert Smith were so involved with new projects that the number of draughtsmen had to be increased. Among the newcomers at that time was W. G. Carter who was appointed chief draughtsman and made responsible for ensuring that experimental drawings were expanded and productionised so that they would be easily understood by inexperienced sub-contractors engaged on construction and assembly. When one recalls that over thirty major sub-contractors were engaged on making Sopwith aircraft, it can be appreciated that Carter's appointment was very necessary. (W. G. Carter incidentally remained with Sopwith's later company, H. G. Hawker Engineering, until 1925 when he joined the Gloster Aircraft Company).

In the same year (1916) Sopwith's decided to improve on the design of a comparatively large prototype triplane which had wings of 53 ft. span and was known as the Long Range Tractor Triplane. It was considered that a scaled-down version of this design using a 150-h.p. Hispano-Suiza engine would make an excellent fighter. Accordingly Herbert Smith took as a basis a fuselage from the 1½ Strutter's production line but because of difficulties with the supply of the engine shortly afterwards decided that an aircraft based on a Pup fuselage with a rotary engine would be preferable.

Drawings were issued of the Sopwith Triplane Single Seat Fighter powered by a 110-h.p. Clerget engine and in May the Experimental Department passed the machine for flight tests which were most satisfactory. The span of the Pup and the Triplane was identical at 26 ft. 6 in.; the effective stagger from the top leading edge to the lower trailing edge was the same but the wing chord of the Triplane was only 3 ft. 3 in. as opposed to the 5 ft. 1½ in. of the Pup.

Later in the year Hawker considered that both Pup and Triplane were somewhat too stable and a more manoeuvrable aircraft was required. He had first recommended that the Triplane's tailplane be reduced in area but then, appreciating the value of the Triplane's high aspect ratio wings and the high rate of climb they provided, the design team decided to abandon the triplane layout and Smith was authorised to produce instead a development of the Pup with higher aspect ratio wings, zero dihedral on the upper wing and two Lewis guns in what appeared to be a hump in the upper fuselage ahead of the pilot. In such a manner was the Camel designed—and the prototype appeared six weeks after the drawings were issued.

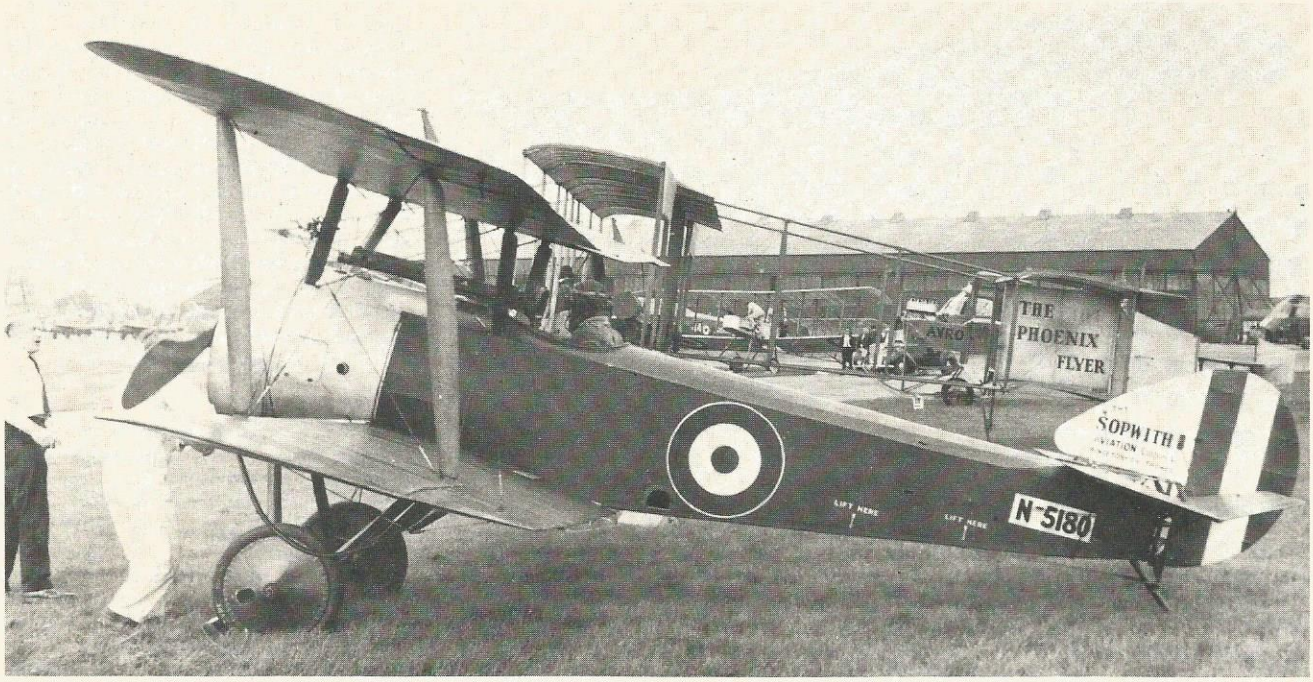
Greatest project

Herbert Smith's greatest project was the Dolphin because it constituted a completely new design using past experience but owing little in basic conception to its predecessors. Designed in 1917 and powered by a 200-h.p. Hispano-Suiza engine, the Dolphin had a pronounced rearward stagger to the wings and was armed with two Vickers guns ahead of the pilot (as in the Camel). In addition, two Lewis guns were mounted on the forward cross tube of the centre-section cabane, the four guns giving greater fire power than any Allied or enemy fighter.

Early in 1918 R. J. Ashfield left the company and joined the newly formed Gosport Aircraft Company and Herbert Smith assumed overall control of the design department, which soon afterwards produced, among other projects, the Snail with an interesting monocoque fuselage. Its A.B.C. Wasp engine proved unreliable and the aircraft did not go into production.

During the last year of W.W.I a wide variety of Sopwith aircraft were being studied. Production had stepped up and such aircraft as the Snipe and the Salamander were replacing the Camel and the earlier Pups. It is hard in a brief review like this to recreate the wide variety and great numbers of aircraft that bore the company's name, the designs for which were super-

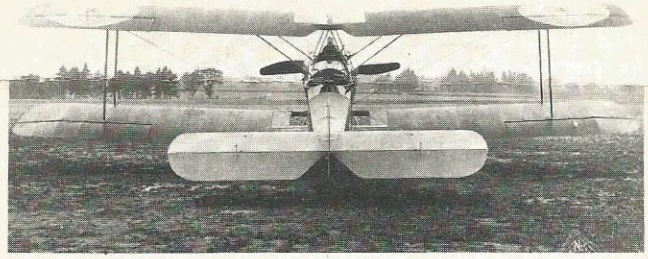
Left: *Cockpit of the Sopwith Dolphin four-gun fighter powered by a 200-h.p. Hispano-Suiza. The most heavily armed fighter of W.W.I, the Dolphin entered service in late 1917 and nearly 1,600 were built.* Right: *Dolphins in the erecting shop at Canbury Park Road, Kingston*



The Shuttleworth Collection's Sopwith Pup, N5180, was originally a Dove two-seat civil version, G-EBKY, but was rebuilt as a Pup in 1937–38. Generally reckoned to be the most pleasant of the W.W.I scouts to handle, the Pup retained its excellent manoeuvrability up to about 15,000 ft. Production totalled 1,847, mostly by Standard and Whitehead; Sopwith's built 97 (Author's photo)

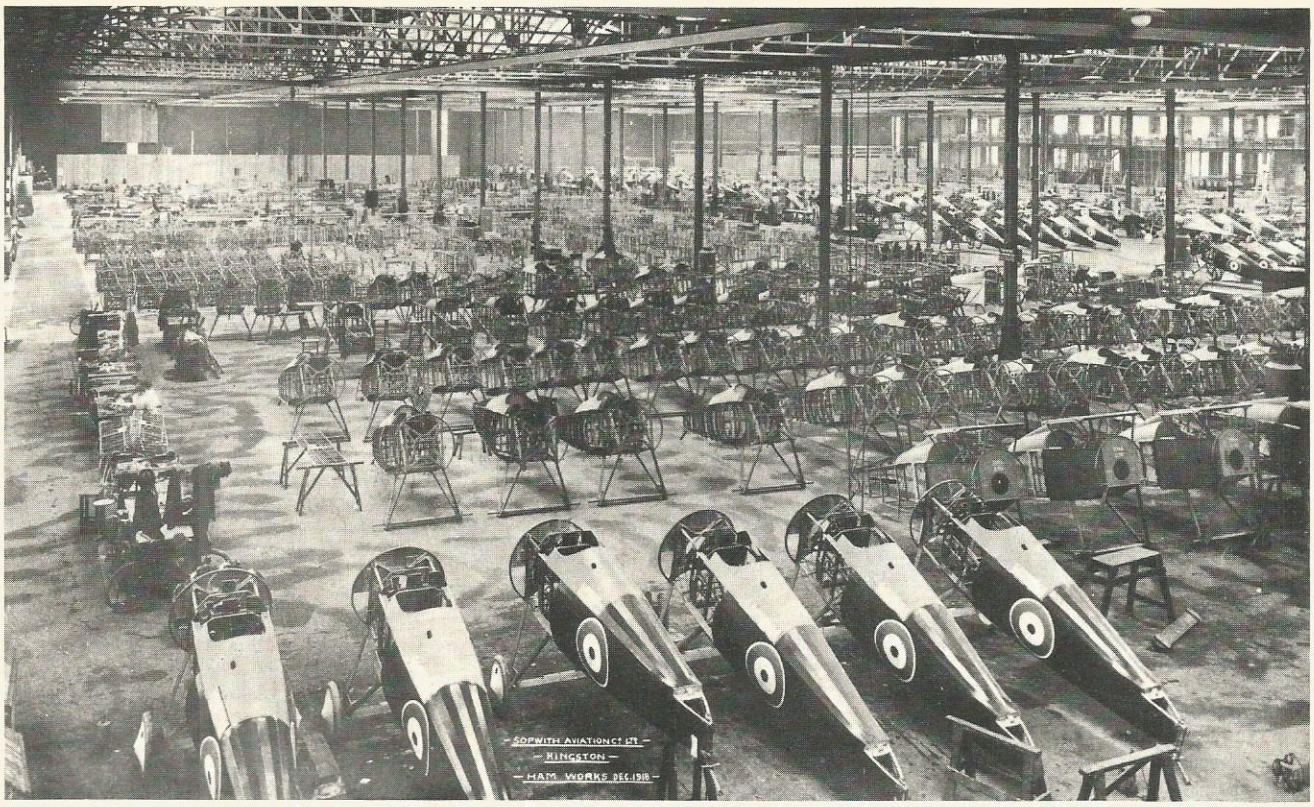
Above: *A Pup taking off from a rudimentary platform on a ship—believed to be the seaplane-carrier H.M.S. "Manxman". The Pup also made history by being the first aircraft to land successfully on an aircraft-carrier, H.M.S. "Furious", on 2nd August 1917*

Below: *Probably the most famous aircraft of W.W.I, the Camel (F.1 version illustrated) is the type credited with destroying the greatest number of enemy aircraft—1,294. It will also be remembered for the rapidity of its right-hand turns—due to the gyroscopic force of its rotary engine. Production totalled 5,497 (Photo: Imperial War Museum)*



Above: *South to North view of a 1½ Strutter showing the centre-section strut arrangement from which the aircraft got its name, the open section of the lower wing roots, the single forward-firing Vickers gun and the Scarff ring for the Lewis gun. Over 5,400 1½ Strutters were built (about 4,200 of them in France) and one specimen is still preserved in the Brussels Military Museum*

Below: *Sopwith Triplane single-seat fighter powered by a 110-h.p. Clerget engine (although some had the 130-h.p. Clerget). It was the first triplane to enter service in W.W.I and 152 were built—103 by Sopwith's at Kingston, 46 by Clayton and Shuttleworth, and 3 by Oakley*



Snipes and Salamanders (with headrests behind cockpit) being built at Ham Works, Kingston, December 1918. Today the scene is of Harriers under construction and the manufacture of Hunter spares; soon the Hawk will also be produced in this building

vised by Herbert Smith. By the end of W.W.I over 18,000 Sopwith aeroplanes had been built.

In September 1920 the Sopwith Company went into voluntary liquidation but two months later the H. G. Hawker Engineering Company was created and so the craftsmen of Kingston-upon-Thames continued building aircraft under the leadership of Tom Sopwith. But Herbert Smith, believing that aviation had come to a standstill in England, had written to several companies in Japan where opportunities for progress at that time seemed to be greater.

With Mitsubishi

Mitsubishi were interested in discussing the possibilities of manufacturing aircraft and so Smith, together with a number of colleagues from the former Sopwith company, left the scene of his momentous and vital wartime work to take up the post which, the following year, established him as the chief engineer of the aircraft division of Mitsubishi.

In 1921 new and extensive aircraft works were established by Mitsubishi at the airfield at Nagoya where Hispano-Suiza engines were built under licence from France and four types of aircraft were laid down for the Japanese Navy:

(1) The Mitsubishi No. 1 Biplane; a single-seat, single-bay fighter, powered by a 300-h.p. Hispano-Suiza engine. The armament consisted of two Vickers machine-guns and the aircraft's maximum speed was 145 m.p.h.

(2) No. 2 Biplane; similar to No. 1 but with two seats and an increased (two-bay) wing span.

(3) A single-seat Triplane powered by a 450-h.p. Napier Lion engine. This aircraft had a divided undercarriage for torpedo-carrying.

(4) The No. 4 Biplane; a two-seater powered by a 450-h.p. Napier Lion engine. This aircraft also had a divided undercarriage for torpedo-carrying.

Japan had expressed a wish to model her fighting services on British standards, and in 1921 a Government delegation of about thirty pilots and engineers who had been in the Royal Naval Air Service left London for Tokyo to advise on such matters at the request of the Japanese Naval Attaché. The delegation was led by Colonel The Master of Sempill. In his paper on his experiences in Japan, which he presented to the Royal Aeronautical Society in April 1924, shortly after his return to the United Kingdom, the Colonel referred to the outstanding work done by, among others, the "technical staff" of the late Sopwith Aviation Company attached to Mitsubishi.

In 1924 Herbert Smith returned to England at the end of his contract with Mitsubishi and retired from the aircraft industry. His name will for ever be connected with the early pioneering days of aviation and of Sopwith aircraft in particular.

The Mitsubishi No. 1 Biplane designed and engineered by Herbert Smith at Nagoya, Japan, between 1921 and 1922. Powered by a 300-h.p. Mitsubishi-built Hispano-Suiza engine, the aircraft had a maximum speed of 145 m.p.h.